



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,096	11/26/2003	John E. Kendall	62806A (1062-023)	1111
25215	7590	05/30/2006	EXAMINER	
DOBRUSIN & THENNISCH PC 29 W LAWRENCE ST SUITE 210 PONTIAC, MI 48326			AN, SANG WOOK	
			ART UNIT	PAPER NUMBER
			1732	

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,096	Applicant(s) KENDALL ET AL.	
	Examiner Sang W. An	Art Unit 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8,9 and 11-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8,9 and 11-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 5, 6, 8, 9, 11-13, 15-20, 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Winckler et al (US 6420047).

As to claim 1, Winckler discloses combining a macrocyclic oligoester and a reactive compound with a transesterification catalyst thereby forming a reactive admixture wherein the reactive compound is selected from another macrocyclic oligoester or a secondary compound (Col 29 Line 55-64); combining the reactive admixture with a linking agent and a reinforcement material to form the sheet molding compound (Col 10 Line 45-56); molding the sheet molding compound at an elevated temperature thereby forming a cross-linked matrix within the sheet molding compound (col 26 lines 3-10) wherein the macrocyclic oligoester reacts with the reactive compound in the presence of the transesterification catalyst to produce a block copolymer (col 30 lines 7-13); the linking agent couples chains of the block copolymer together thereby increasing the molecular weight of the block copolymer (Col 26 Line 3-10).

As to Claim 5, Winckler discloses combining a filler with the reactive admixture wherein the filler and the reinforcement material represent at least about 50% by weight of the sheet molding compound (Col 10 Line 57-60).

Art Unit: 1732

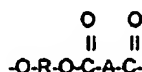
As to claim 6, Winckler discloses blend material wherein the filler is calcium carbonate (Col 10 Line 48-50) and wherein the macrocyclic ester, the secondary compound or both are present in the sheet molding compound in an amount between about 1% and about 30% by weight (col 16 lines 50-51).

As to claim 8, Winckler discloses applying the sheet molding compound to one or more plastic films, the plastic films being at least partially formed of a polyester resin wherein, upon molding, the sheet molding compound is integrated with the one or more plastic films in the one or more parts (Col 27 Line 19-30).

As to claim 9, Winckler discloses admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester, wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage (Col 10 Line 52) and wherein step of molding the sheet molding compound wherein the molding step occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture (Col 11 Line 58-62). Examiner notes that intercalation and exfoliation of the clay platelets in the polymer resin is inherently in Winckler's discussion of nanoclays increasing the modulus of the product. When the nanoclay is mixed/blended into the molding compound, the clays platelets will inherently be intercalated/exfoliated with the macrocyclic oligoester. As further support, it is well established in the field of nanocomposites that adding nanoclays and exfoliating the individual clay platelets will improve the material properties of a polymer such as the modulus.

Art Unit: 1732

As to claim 11, Winckler discloses a macrocyclic oligoester wherein the structural repeat unit of formula is as follows:



wherein R is an alkylene, a cycloalkylene, or a mono- or polyoxyalkylene group, and A is a divalent aromatic or alicyclic group (Col 12 Line 59-64).

As to claim 12, Winckler discloses combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture (Col 29 Line 57-64); combining the reactive admixture with a reinforcement material to form the sheet molding compound (Col 10 Line 45-56); applying the sheet molding compound to one or more plastic films, the plastic films being at least partially formed of a polyester resin (Col 27 Line 19-30 & col 17 lines 35-43). Examiner notes that column 17 teaches using polyester for the release base material and column 27 teaches applying the sheet molding compound/slurry onto this base material film; molding the sheet molding compound with the one or more plastic films at an elevated temperature to form one or more parts wherein, the macrocyclic oligoester react with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound (Col 29 Line 55-64), and the sheet molding compound is integrated with the one or more plastic films in the one or more parts (Col 27 Line 19-30).

As to claim 13, Winckler discloses admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester, wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage (Col 10 Line 52). Examiner notes that intercalation and exfoliation of the clay platelets in the polymer resin is inherently in Winckler's discussion of nanoclays increasing the modulus of the product. When the nanoclay is mixed/blended into the molding compound, the clays platelets will inherently be intercalated/exfoliated with the macrocyclic oligoester. As further support, it is well established in the field of nanocomposites that adding nanoclays and exfoliating the individual clay platelets will improve the material properties of a polymer such as the modulus.

As to claim 15, Winckler discloses the steps of combining the admixture with the reinforcement material and applying the sheet molding compound to the one or more plastic films occur at least partially simultaneously (col 27 lines 5-30).

As to claim 16, Winckler discloses forming a low-shrinkage molding compound into one or more parts, comprising providing a molding compound that includes at least one of a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture (Col 29 Line 57-64), and admixing into the molding compound, a low profile agent including a clay that is intercalated with a macrocyclic oligoester', wherein exfoliation of the clay during polymerization of the macrocyclic oligoester increases volume for offsetting shrinkage (Col 10 Line 52). Examiner again notes that

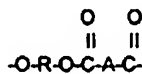
intercalation and exfoliation of the clay platelets in the polymer resin is inherent as explained above in claim 9 rejection.

As to claim 17, Winckler discloses molding the sheet molding compound to form one or more parts wherein the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after admixing the low profile agent into the molding compound (Col 11 Line 58-62).

As to claim 18, Winckler discloses forming a sheet molding compound into one or more parts, comprising: combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture (Col 29 Line 59), combining a reinforcement material with the admixture to form the sheet molding compound (Col 10 Line 47), molding the sheet molding compound at an elevated temperature to form one or more parts having a cross-linked matrix (col 26 lines 5-10) wherein; the macrocyclic oligoester reacts with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound (Col 29 lines 57-64), and (b) the step of molding the sheet molding compound occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture (Col 11 lines 58-62).

As to claim 19, Winckler discloses a macrocyclic oligoester wherein the structural repeat unit of formula is as follows:

Art Unit: 1732



wherein R is an alkylene, a cycloalkylene, or a mono- or polyoxyalkylene group, and A is a divalent aromatic or alicyclic group (Col 12 Lines 59-64).

As to claim 20, Winckler discloses combining a macrocyclic oligoester and a secondary compound selected from a cyclic ester or a dihydroxyl-functionalized polymer with a transesterification catalyst to form a reactive admixture (Col 29 Lines 57-64), combining the reactive admixture with a reinforcement material to form the sheet molding compound wherein the reactive admixture is combined with the reinforcement material (Col 10 Lines 45-56) according to a technique selected from; applying the reinforcement material to one or more plastic films/base material (col 17 lines 35-43); coating the one or more films and the reinforcement material with a supplemental reactive admixture in liquid form/slurry; and applying the reactive admixture to the one or more films (col 27 lines 19-60); applying the reactive admixture/slurry to the one or more plastic films/base material, applying the reinforcement material to the admixture/blend of base material (col 17 lines 35-43), and coating the reactive admixture and the reinforcement material with a supplemental reactive admixture in liquid form/slurry (col 27 lines 19-60); or a combination thereof, and molding the sheet molding compound with the one or more plastic films at an elevated temperature to form one or more parts wherein; the macrocyclic oligoester react with the secondary compound in the presence of the transesterification catalyst to produce a block copolymer of polyester and the secondary compound (Col 29 Line 57 – col 30 line 7).

Art Unit: 1732

As to claim 22, Winckler discloses that macrocyclic oligoester is reacted into the matrix (col 29 lines 57-64).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winckler, as applied in claim 1 rejection, in view Gallucci et al (US 5596049). Winckler teaches everything previously mentioned above in the 102(e) rejection. Winckler, however, does not teach using linking agent selected from a diepoxy resin, a diepoxide, a diisocyanate, a diester or a combination thereof. Nevertheless, Gallucci teaches reinforcing polyesters with diepoxy (Col 9 Line 24). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use Gallucci's

Art Unit: 1732

teaching of reinforcing polyesters with diepoxy in Winckler's molding compound in order exhibit vastly superior melt viscosity and tensile elongation properties (Col 9 Line 25).

6. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winckler, as applied in claim 1 rejection, in view of Ladang et al (US 2002/0153633).

As to claim 3, Winckler teaches everything previously mentioned above in the 102(e) rejection. Winckler, however, does not teach end-capped saturated polyester selected from a polycaprolactone terminated by a phenyl isocyanate and a diethylene glycol adipate polyol terminated by phenyl isocyanate for assisting in maintaining greater dimensional stability. Nevertheless, Ladang teaches terminating polycaprolactone by phenyl isocyanate (Pg 7 Claim 8). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use Ladang's teaching of terminating polycaprolactone by phenyl isocyanate in Winckler's molding compound in order to increase the rate of self-crosslinking in the presence of water (Pg 3 Par 35).

As to claim 14, Winckler discloses the step of molding the sheet molding compound wherein the molding step occurs in a time period selected from within 24 hours of forming the admixture or no less than 10 days after forming the admixture (Col 11 Lines 58-62) and the step of combining the reactive admixture with a reinforcement material includes application of the reinforcement material to the one or more films/base material followed by application of the reactive admixture/slurry to the one or more films (col 27 lines 3-60) but does not teach an end-capped saturated polyester selected from a polycaprolactone terminated by a phenyl isocyanate and a diethylene glycol adipate

Art Unit: 1732

polyol terminated by phenyl isocyanate are present for assisting in maintaining greater dimensional stability. However, Ladang teaches terminating polycaprolactone by phenyl isocyanate (Pg 7 Claim 8). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use Ladang's teaching of terminating polycaprolactone by phenyl isocyanate in Winckler's molding compound in order to increase the rate of self-crosslinking in the presence of water (Pg 3 Par 35).

7. Claims 4, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winckler, as applied in claim 1 rejection, in view of Tikart et al (US 2002/0082350).

As to claim 4, Winckler teaches everything previously mentioned above in the 102(e) rejection. Winckler, however, does not teach linking agent that is reactive monomer selected from a styrene, a methyl methacrylate or a peroxide. Nevertheless, Tikart teaches using styrene as a cross-linking agent (Pg 1 Par 14). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Tikart's teaching of using styrene as a cross-linking agent in Winckler's molding compound in order to enhance the thermal and electrical properties of the resin (Pg 1 Par 14).

As to claims 21 and 23, Winckler discloses that the reinforcement material includes glass fibers (col 14 lines 5-10), the sheet molding compound includes at least 40% filler, which includes calcium carbonate, glass microspheres or both (col 10 lines 45-65), the reactive admixture includes an unsaturated polyester; and the macrocyclic oligoester includes polybutylene terephthalate (col 29 lines 57-64) but does not teach that the reactive admixture includes a styrene monomer. Nevertheless, Tikart teaches

Art Unit: 1732

using styrene as a cross-linking agent (Pg 1 Par 14). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Tikart's teaching of using styrene as a cross-linking agent in Winckler's molding compound in order to enhance the thermal and electrical properties of the resin (Pg 1 Par 14).

Response to Argument

Applicants argue that Winckler et al do not teach "cross-linked network."

However, the examiner notes that Winkler et al teach using surfactants containing glycerin and sugar moieties as a polar group to be used to introduce branching and cross-linking in the final polymer (col 26 lines 5-10). Applicant's arguments are not persuasive.

Applicants argue that Winckler et al do not teach applying the sheet molding compound to one or more plastic films...formed of a polyester resin and that the sheet molding compound is integrated with the one or more plastic films in one or more pads. However, the examiner notes that column 27 lines 4-60 teaches the limitations above. Wincler et al teaches using polyester (col 17 lines 35-43) for the plastic film/base material and column 27 teaches applying the sheet molding compound/slurry onto this base material film; molding the sheet molding compound with the one or more plastic films at an elevated temperature to form one or more parts. Applicant's arguments are not persuasive.

Applicants argue that Winckler et al do not inherently teach intercalation or exfoliation. However, the examiner asserts that intercalation/exfoliation is an inherent

result of blending nanoclay into polymer matrix as explained in the rejections above.

Applicant's arguments are not persuasive.

Applicants argue that Winckler et al do not teach using supplemental liquid reactive admixture material in conjunction with the application of reinforcement material and/or a primary reactive admixture to plastic films. The examiner acknowledges incorrectly citing the column and line number; however, Winckler et al teach the above limitation as shown in columns 27 lines 4-60 and claim 20 rejection. The applicant was referred to this column and line multiple times in the previous office action and therefore should have recognized Winckler's teaching of the said limitations despite the incorrectly cited column and line. In light of this, the applicant's assertion that Winckler et al do not teach limitations of claim 20 is found not to be persuasive.

35 U.S.C. 102 rejection of claim 14 has been withdrawn and instead 103(a) has been applied due to applicant's amendment.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

Art Unit: 1732

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang W. An whose telephone number is (571) 272-1997. The examiner can normally be reached on Mon-Fri 7 AM - 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaizzi can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sang W An *SWA*
Patent Examiner
Art Unit 1732
May 22, 2006

Christina Johnson
CHRISTINA JOHNSON
PRIMARY EXAMINER
5/25/06